R E P O R T R E S U M E S

ED 003 556 56

AN EXPERIMENT TO DETERMINE THE EFFECTIVENESS OF MOTION PICTURES WITH SOUND IN THE TEACHING OF MATERIAL WHICH CANNOT BE DIRECTLY PORTRAYED IN VISUAL IMAGES.

BY- KETCHAM, CARL H. HEATH, ROBERT W.
ARIZONA UNIV., TUCSON

REPORT NUMBER NDEA-VIIA-378 PUB DATE 58
GRANT OEG-7-02-077
EDRS PRICE MF-$0.09 HC-$0.96 24P.

DESCRIPTORS- *FILMS, *AUDIOVISUAL INSTRUCTION, *COLLEGE INSTRUCTION, *AUDIOVISUAL AIDS, *MEDIA RESEARCH, REPETITIVE FILM SHOWINGS, PHONOTAPE RECORDINGS, TUCSON, ARIZONA

FACTUAL LEARNING FROM THE SOUND TRACK OF FILMS WAS ASSESSED EXPERIMENTALLY USING SOUND TRACKS WITHOUT CORRESPONDING OR SOUND-TRACK-RELATED VISUAL IMAGES ON SCREEN. THE PURPOSE OF THE INVESTIGATION WAS TO CREATE A CONDITION WHICH IN PRACTICE MIGHT OFTEN BE IMPOSED ON ADVANCED COLLEGE-LEVEL TEACHING FILMS BY THE COMPLEX OR CONCEPTUAL NATURE OF THE MATERIAL BEING TAUGHT. IT WAS SUGGESTED THAT VISUAL IMAGES NEED IN NO WAY REFLECT SOUND-TRACT MATERIAL - THAT DATA WHICH IS TO BE LEARNED. THE EFFECTIVENESS OF THE METHOD WAS FIRST TESTED IN A PILOT PHASE, AND CERTAIN POSSIBLE CAUSES OF INCREASED LEARNING WERE RULED OUT. THIS WAS FOLLOWED BY THE MAIN PHASE, INVOLVING THE PRODUCTION AND TESTING OF A FULL-LENGTH TEACHING FILM ON THE LIFE AND WORKS OF WORDSWORTH. THE SUBJECTS OF THIS MAIN PHASE WERE COLLEGE-LEVEL UNDERGRADUATES. ALL WERE GIVEN THE VERBAL-APTITUDE SECTION OF THE COLLEGE QUALIFICATIONS TESTS AND PLACED IN SIX INSTRUCTIONAL GROUPS DESCRIBED AS FOLLOWS--(1) SOUND AND PICTURE, ONCE, (2) SOUND ONLY, ONCE, (3) SOUND AND PICTURE, THREE TIMES, (4) SOUND ONLY, THREE TIMES, (5) SOUND AND PICTURE, THREE TIMES, WITH NOTE-TAKING AND STUDY, AND (6) CONVENTIONAL CLASSROOM METHODS. AFTER INSTRUCTION, THE SAME MULTIPLE-CHOICE TEST WAS GIVEN TO ALL GROUPS, AND GROUPS 2 AND 3 WERE RETESTED AFTER A MONTH. THE TEST FILM COMPARED FAVORABLY, WHEN SHOWN REPEATEDLY AND WITHIN THE RANGE OF ITS MATERIAL, WITH CONVENTIONAL TEACHING METHODS. (JH)

ED003556

378

AN EXPERIMENT TO DETERMINE THE EFFECTIVENESS OF MOTION PICTURES WITH SOUND IN THE TEACHING OF MATERIAL WHICH CANNOT BE DIRECTLY PORTRAYED IN VISUAL IMAGES

Carl H. Ketcham and Robert W. Heath

Title VII Project Number 378
National Defense Education Act of 1958
Grant Number 7-02-077

The Research Reported Herein Was
Supported by a Grant from the
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Education

The University of Arizona
Tucson, Arizona

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education
This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated do not necessarily represent official Office of Education position or policy.

AN EXPERIMENT TO DETERMINE THE EFFECTIVENESS OF MOTION PICTURES WITH SOUND IN THE TEACHING OF MATERIAL WHICH CANNOT BE DIRECTLY PORTRAYED IN VISUAL IMAGES

Carl H. Ketcham and Robert W. Heath

Title VII Project Number 378
National Defense Education Act of 1958
Grant Number 7-02-077

The Research Reported Herein Was
Supported by a Grant from the
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Education

The University of Arizona
Tucson, Arizona

ACKNOWLEDGMENTS

The authors would like to thank the following members of the faculty at The University of Arizona for their advice and help during the planning of the project: Dr. Ben C. Markland, Director of the Radio-Television Bureau; Dr. Curtis B. Merritt, Professor of Education; Dr. Neil R. Bartlett, Chairman of the Department of Psychology; and Dr. Richard W. Coan of the Department of Psychology.

Excellent work in the exacting job of preparing the test film was done by Brian Probyn, photographer; Harry Atwood, editor; and Peter Tufts, narrator.

PART I. THE PROBLEM

How much factual learning is possible from a film which does not reproduce on the screen the material in its sound track? This question sooner or later confronts the educator interested in the possibility of extending the usefulness of teaching films through a wider range of disciplines in higher education. Visual images have long established their value in presenting concrete subject-matter: a scene from history, a manual skill, a botanical process, an example of a natural law. But can images also be useful in teaching concepts which, because of their abstractness, complexity, or other sources of elusiveness, refuse to be captured in visual form? It is difficult to imagine how Kant's noumena, or the impact of Darwinism, or the heart of one of Wordsworth's poems could be fixed in a meaningful image. Are such subjects beyond the reach of the teaching effectiveness which has been demonstrated for the sound film?

As a matter of actual practice, commercial producers of educational films often use audio statements which are not illustrated directly, and sometimes the proportion of non-illustrated statements is large. As far as the present investigators can determine, however, the effectiveness of this method has never been thoroughly tested in isolation. For example, the experiments by Nelson and Moll (11), which demonstrated the superiority of sound-plus-picture over sound alone, used films on aerodynamics and desert survival which presumably repeated in concrete visual form the material on the sound track. Again, the silent films tested by Gutzeit (5), in spite of the word abstract in his title, concretely illustrated the material taught (atomic and molecular theory) in diagrams.

The following studies may be noted for their references to audio-visual association, an underlying principle in the experiment described here. May and Lumsdaine (10), describing tests based on the films Osmosis and The Seasons, theorize that "nonverbal stimuli serve as reinforcers in the Pavlovian sense of reinforcement" but add the proviso, which does not apply to the present experiment, that such stimuli must "already have more power to evoke the thought responses of understanding than the verbal stimuli." The same authors suggest that a picture which serves as the common illustration

of an English and a French word may be recalled by the subject when the French equivalent of the English word is asked for -- would, in other words, mediate the response. This sequence might well occur even when the picture did not illustrate the concept in question. The need for associative learning when the image bears a merely conventional relationship to the idea (as a license plate to a car) is mentioned by Gibson (4). Hartman (6) cites evidence suggesting that association between channels of information may increase learning even when only one channel is tested. From these comments and from the nature of association in general, it might be expected that an image would aid learning even though it did not duplicate the audio mode and even though it was not presented to the subject at the time of testing. On the other hand, it seems by no means obvious that appreciable associative learning can take place under the rigorous conditions imposed by a film: a single exposure to each fact-image combination, followed by a long series of other combinations, often quite complex. Such a series of "one-shot" associations is described by Hartman, who tested various combinations of a spoken name, the same name in print, and the picture of a head. A recognition-learning test indicated that the addition of picture to sound and print reduced learning: apparently the picture produced interference. This part of Hartman's experiment parallels the pilot phase of the present experiment to some degree, but with one important exception: Hartman's recognition-learning test presumably suggested to the subject that the channels were equally important, with the result that "...attention was divided and learning in both channels was reduced." The subjects in the present experiment were presumably aware of the high relative importance of the audio channel; thus distraction should have been less.

The purpose of the present investigation was to create a condition which in practice would often be imposed on advanced teaching films by the nature of their material -- that the images in no way reproduce the part of the sound track which is being taught. The effectiveness of the basic method was first tested in a pilot phase, and certain possible causes of increased learning were ruled out. This was followed by the main phase, involving production of a full-length teaching film.

PART II. THE PILOT PHASE

This part of the experiment was designed to answer the following questions:

1. Will sound plus images which do not reproduce the material being taught produce more learning than sound alone?
2. Need these images be relevant to the sound?

A brief narration dealing with a holdup-murder, arrest, trial, and execution was professionally recorded on tape. Story and vocabulary were simple; testing of the method with complex material was to follow in the second phase of the project, but here the basic question was merely whether the learning of any concept is facilitated by a picture which does not embody it, and difficulty of subject would have been irrelevant. Each division of the narration (a) referred to and identified a picture and (b) added relevant information which was not obtainable from the picture. Since it may be assumed that some form of associative learning would be likely to underlie the teaching effectiveness of this method, the relationship between (a) and (b) was one of controlled association: contiguity in time or place, cause and effect, assignment of non-pictorial attributes. Thus:

> "In front of this bank building two men were shot." (Contiguity.)
>
> "This man, the chief of police, predicted a quick solution of the crime." (Cause and effect.)
>
> "This man, the defense attorney, had limited experience in criminal cases." (Assignment of attributes.)

Another statement (c) was sometimes added to (b), linked to it by any of the three above principles or by a fourth, resemblance. Thus:

> "This is the presiding judge. This judge influenced the jury on behalf of the defendant. A similar influence was that of contemporary newspaper reports." (Cause and effect; resemblance.)

Three sets of 35mm black-and-white slides were prepared and shown in a magazine projector as follows:

Set A: Relevant pictures. These illustrated the (a) portions of the narration; care was taken to avoid giving any pictorial clues which might provide information about the (b) or (c) portions.

Set B: Pictures of geometric forms. These were included to determine whether any significant increase in learning which might follow sound-plus-image, as compared with sound only, was the result merely of focussing attention on the screen or providing an abstract sensory stimulus. It was assumed that these images have no significant affective content.

Set C: Pictures of scenes unrelated to the content of the narration. These were included to determine whether any increase in learning resulted from an aesthetic or other stimulus which any picture (as opposed to abstract form) might produce, no matter how irrelevant. To avoid obvious distractions, landscapes without striking features were used. Mention may be made here of an experiment by Neu (12), who introduced irrelevant pictures, geometric forms, and other irrelevant devices into a film. These resulted, as they did in the experiment reported here, in less learning than did the uninterrupted film. Neu's devices, however, were chosen chiefly for their high distraction effect.

Each of three groups of subjects (graduate students in education at The University of Arizona) saw one set of slides accompanied by the taped narration; a fourth group heard the tape only. Equivalence of the four groups was established by means of the Otis Quick Scoring Mental Ability Test, as follows:

TABLE 1

Group:		Mean Raw Score	Mean I.Q.
1.	Sound only (N = 40)	59.6	117.6
2.	Sound plus relevant slides (N = 29)	58.7	116.7
3.	Sound plus irrelevant slides (N=30)	60.6	118.6
4.	Sound plus slides of geometric forms(N = 21)	60.4	118.4

A single classification analysis of variance was performed on these data. The results were:

TABLE 2

Source	Sums of Squares	df	Mean Squares
Between	65.03	3	21.68
Within	9,140.44	116	78.80
Total	9,205.47	119	

F = .275

Not significant at the 5% level

This analysis demonstrates that the four groups were homogeneous in mental ability.

The testing instrument was a thirty-item multiple-choice test, based on the (b) and (c) portions of the narration, and pre-tested and item-analyzed by presenting it to a group of about twenty upper-division students, following the standard narration. As calculated by the Kuder-Richardson Formula No. 20, its reliability coefficient was .83. This test was given to all groups, with the following results:

TABLE 3

Group:		Mean Raw Score
1.	Sound only (N = 40)	20.4
2.	Sound plus relevant slides (N = 20)	22.1
3.	Sound plus irrelevant slides (N = 30)	16.3
4.	Sound plus slides of geometric forms (N = 20)	19.2

A single classification analysis of variance was performed on the test data. The results were:

TABLE 4

Source	Sums of Squares	df	Mean Squares	
Between	522.45	3	174.15	
Within	2,356.83	115	20.49	F = 8.50
Total	2,879.28	118		Significant at the 1% level

Thus the pilot test shows that sound with images which do not embody the material being taught produces an increase in factual learning over the next most effective method, sound alone. It also appears that abstract forms distract attention more than they improve concentration; and this distraction is worsened by the increased detail, or the incongruity, of an irrelevant picture.

PART III. THE MAIN PHASE: PURPOSES AND PROCEDURES

This phase was designed to answer the following questions:

1. Can the gain reported in the pilot study be maintained when the method tested is applied to the extended, relatively difficult material of a college-level film?
2. To what extent is the effectiveness of such a film aided by repetition?
3. To what extent by note-taking?
4. Used under optimum conditions, how does such a film compare with conventional teaching methods?
5. How well is its subject-matter retained?
6. Who learns best from it?

The basis of this part of the experiment was a 26-minute black-and-white film on the life and work of William Wordsworth, with frequent brief quotations from his poetry. The film was photographed in England and France. In general, its visual portion bore the same relationship to the audio as picture did to sound in the pilot test: a summary of a poem was accompanied by the scene which

inspired it or the spot where it was composed, an event in the poet's life by the place where it occurred. In no case were questions asked about anything that had been directly represented on the screen. However, in accordance with normal film practice, two minor departures from the method of the pilot test were followed. First, more statements were attached to a single image. Second, since the principle of excluding all visual suggestion of subject-matter had already been quite rigorously tested, a limited use of mood and symbol was allowed. A somewhat eerie night scene accompanied Wordsworth's frightening adventure with the stolen bird; a sundial was the background for discussing his skill in mathematics. These, of course, do not go beyond the ordinary materials of landscape photography; and some care was taken to avoid questions on scenes which clearly implied an answer which they did not show. A picture of a sheep, for instance, precluded a question whose answer was "a shepherd."

Difficulty of material. The main phase of the project provided verification of a method whose effectiveness had been indicated by the pilot phase; but the distinctive practical importance of the second test was that it repeated the first under the conditions which might be expected of films on the college level. There was no effort to limit the number of facts in the script; on the contrary, it was somewhat condensed and probably covered about as much ground as a carefully-organized introductory college lecture of the same length. As to the difficulty of the ideas, there were two restrictions: lack of time prevented much elaboration of any one point, and, for test purposes, the vocabulary was kept as simple as was consistent with clear expression of the poet's ideas. (May (10) reports a gain in learning following the elimination of relatively long sentences, long words, and unfamiliar words in the film commentary, when the level of material was that of an advanced high school textbook.) Within these limits, however, the film attempted to deal broadly but maturely with its subject. There would seem to be a possibility, then, that the advantage of the method tested in the pilot phase might be offset by the increased length and difficulty which are a necessary part of a college-level film. Evidence from other experiments tends to support this

possibility. The college groups tested by Vincent, Ash, and Greenhill (15) performed better (not surprisingly) at learning four facts per minute than eight per minute. Jaspen (7) indicates the value of a slow rate of development in a training film. The extent to which these findings may apply to advanced students generally, however, is uncertain.

As in the pilot test, the effectiveness of sound-plus-image was checked by comparing groups that saw and heard the film with groups that only heard the sound track (in the dark, as recommended by Nelson and Moll (11)).

Effect of repetition. As might be expected, experimental evidence indicates that repetition of a conventional teaching film increases learning. McTavish (9) reported that the second showing of a film on general science produced significant increases in test scores; increases produced by further showings were not significant. Jaspen (7) and Lumsdaine (8) showed that repetition of a practical demonstration within a film contributed to teaching effectiveness. Accordingly, the Wordsworth film was compared with its sound track on the basis both of one and of three presentations. The single presentation, of course, was necessary because a film is shown only once in ordinary practice; any superiority it might have over a taped lecture would usually have to produce its effect without benefit of repetition. The three showings, on the other hand, were designed to approximate optimum conditions for the use of the film. It was assumed that this number of repetitions might take advantage of increases in learning beyond the significant increases demonstrated for McTavish's two showings, without a serious negative effect arising from fatigue. Testing of the film under the most favorable conditions was also necessary for a fair comparison with conventional classroom methods.

Note-taking. This part of the test was also designed to give students a maximum opportunity to learn from the film; however, results of other experiments indicated that increased learning as a result of note-taking was unlikely under ordinary conditions. Ash and Carlton (2) report that note-taking during a single showing of a film, and note-taking combined with a

ten-minute study period, resulted in test scores significantly lower than those achieved by a group viewing the film without note-taking. They cite the results of Vernon (14) as showing that even with film strips, which can be stopped for note-taking, no significant improvement in scores resulted from taking notes. Ford (3) shows that notes taken during a high school science film distracted students from concentrating on key ideas and making generalizations. Accordingly, the note-taking in the present experiment was done under conditions intended to give the subject as many advantages as possible. The film was first shown in the dark. Then the lights were turned up and the film, which was still perfectly visible, was repeated while the subjects took notes. The film was shown a third time with the lights up so that the notes could be corroborated; finally, an hour was allowed for study before the standard test was administered. Thus distraction from the film by the act of note-taking should have been minimized. On the other hand, the process was a long one and may have been tiring.

Comparison with results achieved by conventional teaching methods. While recognizing that the purposes of a specialized college course and an introductory college film are quite different, the experimenters felt that a general indication of the usefulness of the film in the college classroom might be obtained by a comparison with a class taught by ordinary methods--lectures, reading, discussion. This method was frequently used in early studies of the teaching film; for example, Arnspiger (1), studying films on science and music in grades five and seven, reported gains of from twenty to sixty per cent in favor of film groups compared to conventional training methods. The control group in the present experiment was an upper-division class studying Wordsworth at The University of Arizona. Over a period of several weeks this group covered all of the material in the film. To insure proper review and maximum effort, the standard test was presented as a mid-term examination, without further explanation.

Retention of subject-matter. Since it goes without saying that the ultimate usefulness of a film depends on how well its subject-matter is retained, the group which saw and heard the film three times and the group which heard the sound track three times repeated the standard test after a month.

In summary, the groups tested were as follows:

1. Sound and picture, once.
2. Sound only, once.
3. Sound and picture, three times.
4. Sound only, three times.
5. Sound and picture, three times, with note-taking and study.
6. Conventional classroom methods.
7. Group 3 re-tested.
8. Group 4 re-tested.

The subjects were undergraduates at The University of Arizona, chiefly freshmen and sophomores (except the upper-division class in the Romantic period). All were given the Verbal Aptitude section of the College Qualification Tests. Scores on this test were regarded as an approximate measure of learning ability. (Radlow(13) found that high verbal comprehension, as well as general reasoning power and spatial orientation, was characteristic of superior film learners.) Accordingly, the subsequent scores on the test film were corrected by the verbal aptitude scores so that, in effect, verbal aptitude was constant for each subject.

The testing instrument consisted of forty-eight multiple-choice questions. (The last ten had more than one correct alternative and were scored accordingly.) The test was developed from an original seventy-five questions which were pre-tested by presenting them, following a reading of the script of the film, to a class of undergraduate summer-session students at The University of Arizona.

PART IV. THE MAIN PHASE: STATISTICAL RESULTS

In order to test the significance of difference among the group means on the multiple-choice test by analysis of covariance, it was necessary to test the assumption that the regression slopes between predictor (verbal aptitude)

and criterion were not significantly different among the groups. This test was conducted with the following results:

TABLE 5

Group:	b weight	df
1. One sound and picture	.5362	26
2. One sound only	.7059	11
3. Three sound and picture	.4265	30
4. Three sound only	.7227	28
5. Three sound and picture; notes; study	.3787	33
6. Classroom study	.3937	14

TABLE 6

Source of Variation	df	Mean Square
Deviations from average (error) regression within groups	147	---
Differences among group regressions	5	34.2984
Deviations from individual group regressions	142	18.8419

F = 1.82
Not significant

This result permits us to proceed with the analysis of adjusted group achievement means. In summary these data are:

TABLE 7

Group:	$\overline{X}$	$\overline{X}$ Adjusted	$\overline{Y}$	Observed Rank ($\overline{X}$ Adjusted)
1. One sound and picture	34.6	34.6	57.4	5
2. One sound only	30.3	31.4	53.3	6
3. Three sound and picture	38.8	39.5	54.9	2
4. Three sound only	36.7	36.5	58.1	4
5. Three sound and picture; notes; study	39.3	39.6	56.2	1
6. Classroom study	40.2	37.7	67.4	3

X = Achievement
Y = Verbal Aptitude
$\overline{X}$ Adjusted = $\overline{X} - b(\overline{Y}_i - \overline{Y}_T)$

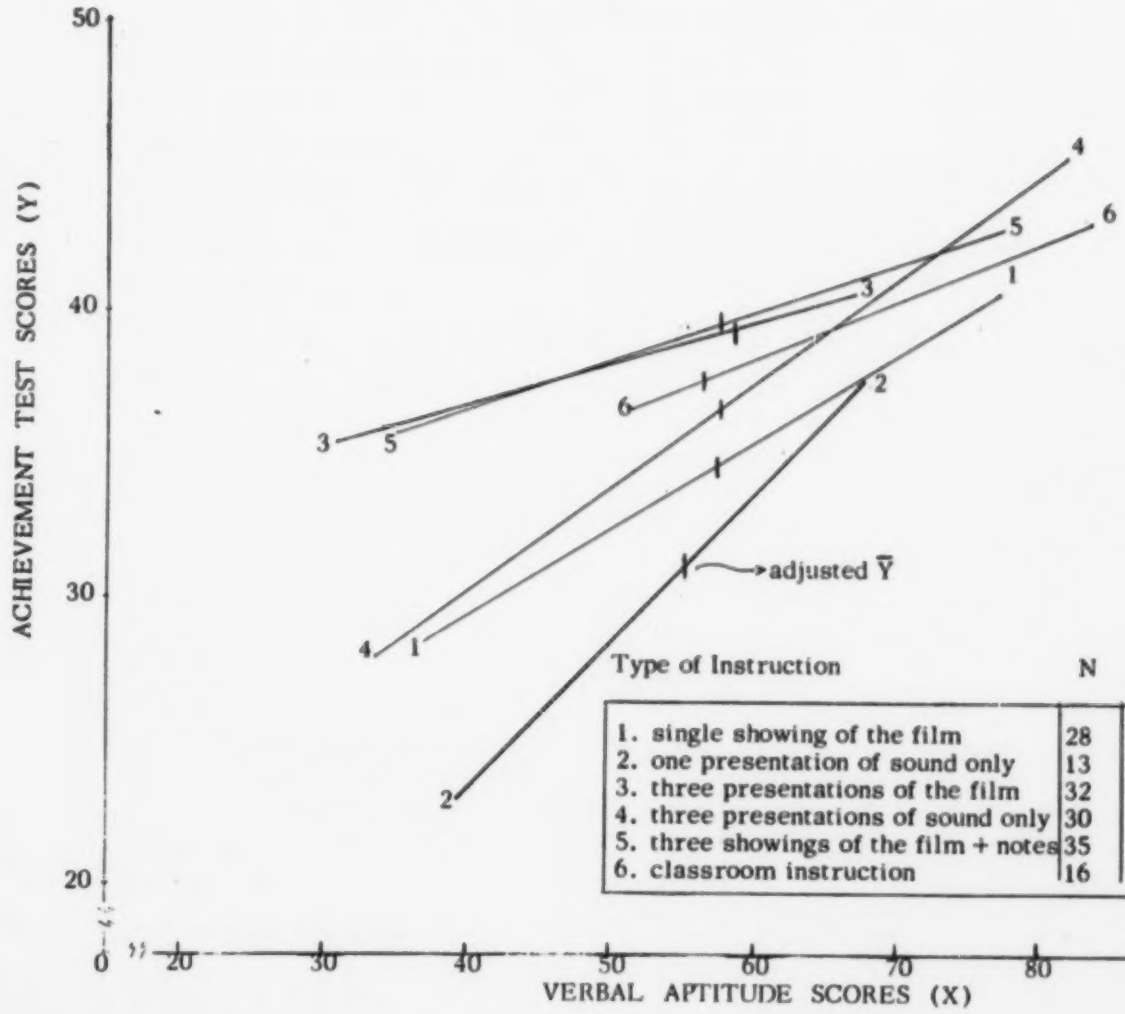
The analysis of covariance yields these results:

TABLE 8

Source of variation	df	SS	Mean Square
Between Groups	5	1021.9851	204.3970
Within Groups	1487	2847.0402	19.3676
Total	152	3869.0253	

F = 10.55
Significant at the 1% level

The regression data were also plotted graphically (Figure 1):



Type of Instruction	N	Adjusted Ȳ	r	b_{yx}
1. single showing of the film	28	34.62	.54	.30
2. one presentation of sound only	13	31.35	.71	.52
3. three presentations of the film	32	39.48	.43	.15
4. three presentations of sound only	30	36.51	.72	.36
5. three showings of the film + notes	35	39.62	.38	.17
6. classroom instruction	16	37.74	.39	.22

Finally, the test scores of Groups 3 and 4, omitting scores of subjects who missed the re-test and adjusted for verbal aptitude, were subjected to a test of assumption of parallel slopes (Table 10) and an analysis of covariance (Table 11), as follows:

TABLE 9

Group:	First test	Re-test
3. (Three sound and picture)	39.47	34.23
4. (Three sound only)	37.29	34.16

TABLE 10

Test of Assumption of Parallel Slopes

Sources of variation	df	SS	Mean Square
Deviation average regression within group	40	776.87	19.42
Differences among group regressions	1	35.31	35.31
Total	41	812.18	19.81

$F = 1.82$
$F_{.05} = 4.08$

Not significant

TABLE 11

Test of Significance of Difference Between Adjusted Means

Sources of variation	df	SS	Mean Square
Adjusted Means	1	49.13	49.13
Within Groups	41	812.18	19.81
Total	42	861.27	

$F = 2.48$
$F_{.05} = 4.08$

Not significant

PART V. THE MAIN PHASE: INTERPRETATION OF RESULTS

Effectiveness of type of image tested. It appears from the test of significance in Table 8 and the order of the means in Table 7 that sound with visual images which do not directly portray the subject-matter of a film results in more learning than sound alone. This is true both of a single showing and of repeated showings (which might be expected to give

a larger proportional advantage to the sound track) and seems to apply to reasonably long and difficult material. The differences in mean achievement scores are, in general, large and probably of practical educational significance as well as statistically reliable.

Effectiveness of repetition. Three film presentations with or without picture produce more learning than a single presentation. Three presentations with sound and picture consistently yield higher achievement than the other modes throughout the aptitude range, as shown in Figure 1.

Effectiveness of note-taking. Although the group which took notes had a slightly higher mean achievement score than the group which only saw and heard the film three times, Figure 1 indicates that the difference is probably not practically meaningful.

Comparison with conventional teaching methods. The group which saw and heard the film three times achieved a higher adjusted mean score than the group which covered the same material by conventional classroom methods, though the classroom group, which included a number of superior students, had a higher unadjusted mean. The result of this part of the test may need to be qualified somewhat. The classroom group covered much more material on Wordsworth than the film presented; they frequently discussed detailed meanings when the film confined itself to a single summary statement; their study was spread over several weeks, though they reviewed for the test. Nevertheless, it appears that repeated showings of the film can teach a limited amount of factual material at least as well as the same material could be presented in class. The film might well be useful for review or for giving general insight into a subject tangential to the main concern of a particular course.

Retention of subject-matter. The tests and re-tests of Groups 3 and 4 were assessed separately, eliminating from the first pair the subjects who did not show up for the second test. The result, as shown in Tables 9-11, was that no significant difference could be demonstrated between the adjusted original three-sound-and-picture and three-sound-only groups; and the difference between the re-test groups was even less. In short, the results of this test were statistically inconclusive, though the relatively steep rate of forgetting on the part of the sound-picture group may be noted.

Relation of results to verbal aptitude. Figure 1 indicates that there is a general trend toward convergence of achievement in the upper aptitude range -- that is, what type of audio-visual presentation is used matters less for high-aptitude than for low-aptitude students. The relatively low achievement associated with the sound-only presentations is especially marked in the case of low-aptitude students.

PART VI. DISCUSSION AND CONCLUSIONS

What bearing does the present experiment have on the use of films in college teaching? First, it may be hoped that it will help to dissipate whatever may remain of a lingering preconception that, because a film can show things concretely, it must. The effort to present a topic visually, though it can produce valuable results in a teaching film, need not dominate film planning. The advantage to the flexibility of the individual film is apparent, as are the possibilities for the extension of teaching by film into more abstruse branches of subject matter.

Second, films of the sort described here are relatively inexpensive. They require no actors, sets, photographers' assistants, or special lighting. Counting fares to England and back, a master and one finished print of the test film cost about $5,000 -- an amount well within the realm of possibility for educational budgets.

Third, as has been pointed out, the film can do its work well both under normal conditions of use (one showing) and under optimum conditions (repeated showings). The experimental results suggest that students with relatively low verbal aptitudes can profit especially by the addition of images to verbal presentation. With repeated showings the film compares satisfactorily with classroom methods. It might be effectively used to supplement them, even on the basis of a single showing.

On the other hand, if the method described here were used in isolation -- which would seldom be the case -- it would, of course, have its own limitations.

When biographical details are sparse, linking a fact with a specific scene is difficult; as with the conventional type of image, the producer would need to resist a tendency to let the availability of visual material limit the scope of the film. Again, some subjects are too much associated with a single place; the problem then becomes one of photographic variety. Since a number of statements must often be linked with a single scene, the average shot in the present film was quite long; there was sometimes a conflict to be resolved between lengthening or supplementing the shot and condensing the script. Wagner (16) found that the average shot in school films was seven seconds as compared to ten seconds in adult films; subjectively speaking, the first seems somewhat short for full effectiveness. Scenes in the test film averaged somewhat more than 14 seconds, which certainly is well in excess of the minimum necessary length. Frequently, however, it was possible to counteract a static quality, which might have contributed to early loss of attention, by finding incidental motion in the scene -- water, clouds, tall grass. Camera movement was comparatively little used.

Perhaps a more cogent objection to the method of the film is that, used in teaching poetry, it might well tend to distort the genuine meaning of the author's work. An actual landscape, it might be argued -- even the landscape which inspired the poet -- is not really what the poem is about; instead, the poet wants to convey a landscape-plus-imagination, a scene more real than its material source because of newly apprehended relationships with other ideas. Furthermore, he wants the reader to share in the process by re-creating (with inevitable differences) the meaning of the picture in his own mind; and a ready-made image kills this process before it starts. In answer to this it can be suggested that the image in the film is perhaps less a picture than a picture-frame, a background on which the viewer can hang, by association, his own images created by the poem. Some sharing of the poet's initial experience is essential to an understanding of his values and workmanship. Films can bring this about by acquainting the reader with a visual world which he knows only approximately. Beyond this, into the world of the creative process which begins with the visual image, the film need not -- and should not -- intrude.

What areas for further investigation does the project suggest? A more thorough testing of the retention of material over varied intervals might produce the conclusive results which were lacking in the present experiment. It would be useful to know, also, how many statements can be attached to a single picture or related pictures before the teaching effectiveness of the image wears out. Finally, it might be ascertained whether any effect except association is operative in producing the results shown in the experiment. Does the visual image give a sense of actuality which serves as a stimulus, or imply a question which the sound-track answers, or, as suggested above, provide a setting for the viewer's own image of the sound-track material? Experiments aimed specifically at identifying these possible effects might lead to instructive results.

REFERENCES

1. Arnspiger, Varney C. Measuring the Effectiveness of Sound Pictures as Teaching Aids. New York: Columbia University Press, 1933.

2. Ash, Philip, and Bruce J. Carlton. "The Value of Note-taking during Film Learning." British Journal of Educational Psychology, XXIII (1953), 121-125.

3. Ford, W. E., Jr. "Is Note Taking when Viewing Motion Pictures Effective in High School Science?" Education, LXVIII (1947), 125-127.

4. Gibson, James J. "A Theory of Pictorial Perception." AV Communication Review, II (1954), 3-23.

5. Gutzeit, C. L. "Teaching an Abstract Concept in Science by Means of the Motion Picture." Educational Screen, XVI (1937), 147-148, 150-151.

6. Hartman, Frank R. "Recognition Learning under Multiple Channel Presentation and Testing Conditions." AV Communication Review, IX (1961), 24-43.

7. Jaspen, Nathan. Effects on Training of Experimental Film Variables, Study I: Verbalization, Rate of Development, Nomenclature Errors, "How-It-Works," Repetition. Port Washington, N. Y.: Special Devices Center, 1952.

8. Lumsdaine, A. A., ed. The Value of Using Multiple Examples in Training Film Instruction. Washington, D. C.: Human Resources Research Laboratories, Bolling Air Force Base, 1952.

9. McTavish, C. L. Effects of Repetitive Film Showings on Learning. Port Washington, N. Y.: Special Devices Center, 1950.

10. May, Mark A., and Arthur A. Lumsdaine, in collaboration with H. S. Hadsell, A. I. Gladstone, and J. J. Howell. Learning from Films. New Haven: Yale University Press, 1958.

11. Nelson, Harold E., and Karl R. Moll. Comparisons of the Audio and Video Elements of Instructional Films. Port Washington, N. Y.: Special Devices Center, 1952.

12. Neu, D. Morgan. "The Effect of Attention-Gaining Devices on Film-Mediated Learning." Journal of Educational Psychology, XLII (1951), 479-490.

13. Radlow, Robert. "The Relation of Some Measures of Ability to Measures of Learning from Sound Motion Pictures." AV Communication Review, IV (1956), 162-163.

14. Vernon, P. E. "An Experiment on the Value of Film and Filmstrip in Instruction of Adults." British Journal of Educational Psychology, XVI (1946), 149-162.

15. Vincent, W. S., P. Ash, and L. P. Greenhill. "A Preliminary Report on Project No. 12: Relationship of Length and Fact Frequency to Effectiveness of Instructional Motion Pictures." Progress Report No. 13, Instructional Film Research Program. State College, Pennsylvania: Pennsylvania State College, 1950, pp. 14-24.

16. Wagner, Robert Walter. "Design in the Educational Film." AV Communication Review, IV (1956), 167.